

247. The process according to Claim 233 or 234 wherein said extracted C₆₀ product is in solution of a non-polar organic solvent.

G2
cont'd

248. The process according to Claim 246 wherein the non-polar organic solvent is benzene, toluene, carbon tetrachloride, 1,1,1-trichloroethane, xylene or an alkane having 5-10 carbon atoms.--

REMARKS

The present application was filed May 2, 1994, and is a continuation of USSN 855,959, filed on March 23, 1992, which is a Rule 60 continuation of USSN 781,549 filed October 22, 1991, now abandoned, which is a Divisional of Serial No. 580,246, filed September 10, 1990, which is a CIP of Serial No. 575,254, filed August 30, 1990. Thus, the effective filing date is August 30, 1990.

This is 37 C.F.R. §1.129(a) submission. This submission is proper in that this application has been pending for at least two years as of June 8, 1985, taking into account any reference made in such application to any earlier filed application. This submission is being filed during the pendency of the above-identified case, and no Appeal Brief has been filed in the application. Further, this is the first '129 submission in this case. Finally, the requisite fee under 37 C.F.R. §1.17(r) has been authorized to be charged to the Deposit Account in a letter accompanying this submission.

Applicants wish to thank Examiner DiMauro for advising their counsel that the Response has been entered and considered on the merits. But, the record seems ambiguous on this point, because the Advisory Action indicates that the Amendment after Final will be entered upon the filing of the Appeal Brief. Even the Advisory Action commences with the assumption that an Appeal Brief will be filed. However,

applicants chose not to file an Appeal Brief, but instead is, filing a Response pursuant to 37 C.F.R. §1.129(a). Under these circumstances, it is not clear whether the Amendment under 37 C.F.R. §1.116 dated September 22, 1997 will be entered. To make the record clear, applicants are resubmitting the Response under 37 C.F.R. §1.116 with the executed Declaration of Wolfgang Kratschmer attached thereto, and is requesting entry and consideration thereof, if not previously entered.

In addition, applicants are filing this submission for entry and consideration. This is being filed to address the one new issue raised in the Advisory Action. This Amendment is supplemental to the Response after Final referred to hereinabove. This Amendment is not intended to replace the Amendment under 37 C.F.R. §1.116 dated September 22, 1997. Thus, applicants are requesting entry and consideration of the Response under 37 C.F.R. §1.116 dated September 22, 1997, and the Amendment herein and is requesting withdrawal of the finality of the final rejection.

In this Amendment, Applicants have added Claims 232-248 in the above-identified application. Claim 232 incorporates the subject matter of Claim 50. Upon reviewing the subject claims, it was noted by applicants that there is an ambiguity in the language of Claim 50, that is; the claim language added in an amendment did not track exactly with original Claim 50. To avoid ambiguity, the subject matter of Claim 50 was incorporated into new Claim 232, and Claim 50 was cancelled. In addition, the dependencies were amended in accordance therewith.

Claims 233, 234 et seq. were also added to the application. They are directed to other embodiments for which there is ample support in the application. Claim 233 recites that the vaporization of elemental carbon is conducted in the

presence of an inert quenching gas under conditions effective to form a sooty carbon product comprising C_{60} in amounts sufficient to isolate C_{60} as a solid when extracted from said sooty carbon product, that the sooty carbon product is collected on a collecting substrate and then removed therefrom, and that C_{60} is extracted from sooty carbon product in quantities sufficient to isolate C_{60} as a solid. Claim 233 recites a pressure for the vaporization. Support for the pressure is found on Page 6, Lines 25-30 and Page 4, Line 21 to Page 5, Line 7 of the instant specification. Support for the concept that the C_{60} is isolated as a solid is found throughout the specification, for example, on page 7, Lines 18-23; Page 8, Line 6 to Page 10, Line 10, and Page 16, Lines 1-26 of the instant specification. Steps (b) and (c) of Claim 233 find support in the specification on Page 5, Lines 7 to 18, Page 7, Lines 8-10 and Example 1, Page 16, Lines 11-18 of the instant specification.

Claim 234 recites a process for making C_{60} comprising vaporizing elemental carbon within a specific pressure range under conditions effective to form a sooty carbon product comprising C_{60} in amounts sufficient to isolate C_{60} as a discernible solid when extracted from the soot, and extracting the C_{60} from the soot in quantities sufficient to isolate the C_{60} as a discernible solid. Support for the "pressure" is found on Page 6, Lines 25-30 and Page 4, Line 21 to Page 5, Line 7. Support for the product being discernible is found throughout the specification, e.g., Page 7, Lines 18-23, Page 18-23, Page 8, Line 6 to Page 10, Line 10, and Page 16, Lines 1-26 of the instant specification.

Thus, there is adequate support in the specification for these two claims.

There is adequate support in the specification for claims 235 et seq. Support for the Claims 235 et seq. is tabulated below:

CLAIM #	SUPPORT
235	Page 3, Lines 30-32
236	Example 1; Page 16, Lines 11-14
237	Page 3, Lines 30-32
238	Page 5, Line 29 to Page 6, Line 6; Claim 1
239	Page 5, Line 29 to Page 6, Line 6
240	Page 13, Lines 26-31
241	Page 14, Lines 4-13
242	Page 13, Line 30 to Page 14, Line 4
243	Claim 26; Page 7, Lines 18-20
244	Page 7, Lines 22-25
245	Page 4, Lines 20-25
246	Page 5, Line 18 to Page 6, Line 20; Page 7, Lines 10-17
247	Page 5, Line 18 to Page 6, Line 20; Page 7, Lines 10-11
248	Page 5, Line 29 to Page 6, Line 6

Thus, no new matter has been added to the application.

Respecting the merits of the Advisory Action, the only new issue raised therein relates to the Declaration of Dr. Wolfgang Kratschmer ("Kratschmer Declaration") that was submitted by applicants in response to the rejection in the Office Action dated April 22, 1997. The Office Action rejected the claimed invention under 35 U.S.C. §103 citing various references, with the primary reference being an article in Chemical Physics Letter 1990, 167-170 ("article"). The authors of the article are Huffman, Kratschmer and Fostiropoulos. The inventive entity of the present invention are Huffman and

Kratschmer. The Kratschmer Declaration was submitted to establish that Fostiropoulos was not an inventor of the subject matter in the article, and thus the article is not an invention of another and is not a proper reference pursuant to the holding in In re Katz, 687 F.2d 450, 215 USPQ 14 (CCPA 1982).

The Advisory Action indicated that the Kratschmer Declaration was ineffective to overcome the rejection, relying on certain hearsay passages in a book entitled "Perfect Symmetry: The Accidental Discovery of Buckminster fullerene" by Jim Baggott ("Baggott"). More specifically, the Advisory Action directs applicant's attention to Pages 138-139 of Baggott, which according to the Advisory Action suggests that Fostiropoulos "innovated in the matter of fabrication and use of carbon-13 rods" and Page 150 which the Advisory Action suggests that "Fostiropoulos innovated in the matter of sublimation of various C₆₀ films". The Advisory alleges that Baggott presents rebuttable evidence that Fostiropoulos is a co-inventor and it thereby rejects the statements in the Kratschmer declaration that Fostiropoulos is not an inventor of the subject matter in the application or in the article (Paragraphs 6 and 9 of Kratschmer Declaration).

What the United States Patent and Trademark Office has conveniently overlooked was that the statements in Baggott are hearsay, pure and simple. The Office Action is relying upon these statements in Baggott for the truth of the matters asserted, but as the author admits, he was not present in Kratschmer's laboratory at the relevant time when the events reported upon were occurring. Even Baggott admits that he is only a reporter trying to assimilate the information:

I have put together my description of the events in Heidelberg and Tucson from December 1985-September 1990 from a combination of personal interviews with Kratschmer, Fostiropoulos, and Huffman, telephone conversations with Lamb,

letters from Kratschmer and Fostiropoulos and published accounts.

Id., Page 271.

In other words, Baggott is acting as a sieve --a filter, so to speak. Based upon the various sources, he is providing his interpretation and his viewpoints of the facts and reporting thereon. However, he has no personal knowledge of the events that occurred. Furthermore, the statements therein are not made under oath and are not sworn testimony. Thus, as an evidentiary matter, very little weight should be given to his statements.

On the other hand, the statements made by Kratschmer was made by a person who has personal knowledge of the events that occurred at the relevant time. He was there. The events occurred in his laboratory. Thus, his testimony should be given considerably more weight, especially since his statements are given in a Declaration with a penalty attached thereto if statements were made with the knowledge that they were willful and false.

Just as in In re Katz, the United States Patent and Trademark Office is ignoring the statements in the Declaration. Specifically, it is ignoring the following statements:

6...It is my opinion that and I have been advised by counsel that he [Fostiropoulos] is not an inventor of the subject matter described and claimed herein...

8. Although K. Fostiropoulos performed experiments described in the article, those experiments described therein which he performed were conducted under my direction and supervision.

9. It is my opinion that and I have been advised by counsel that K. Fostiropoulos is not an inventor of the subject matter described in the publication.

These statements are not surplus, but have real meaning. As the Court stated in In re Katz.

In the declaration, appellant provides the explanation that the co-authors of the publication, Chiorazzi and Eshhar, "were students working under the direction and supervision of the inventor, Dr. David H. Katz." This statement is of significance since it provides a clear alternative conclusion to the board's inference that their names were on the article because they were coinventors. As acknowledged by the examiner, the names of individuals may be given as authors of a scientific report who are "involved only with assay and testing features of the invention." Appellant's explanation is, thus, consistent not only with the content of the article but with the nature of the publication. On the record here, the board should not have engaged in further speculation as to whether appellant's view was shared by his co-authors but rather should have accepted that Chiorazzi and Eshhar were acting in the capacity indicated, that is, students working under the direction and supervision of appellant. From such a relationship, joint inventorship cannot be inferred in the face of sworn statements to the contrary.

The advisory Action alleges that the Declaration is defective because, according to the Advisory Action, "Declarant appears to be ascribing the basis for concluding that co-author Fostiropoulos was not a co-inventor, from a source who is neither a Declarant nor a co-author, namely Applicants' counsel." The Advisory Action further questions the standard used by applicant's attorney in reaching that conclusion.

It is respectfully submitted that the United States Patent and Trademark Office has misinterpreted the statements of declarant. Declarant specifically stated it is his opinion that Fostiropoulos is not a co-inventor and that his counsel legally agrees with that conclusion.¹

In addition, contrary to the allegations in the Office Action, the passages referred to in the Advisory Action are not inconsistent with the statement in the Declaration.

¹ The United States Patent and Trademark Office has read more into that statement than was there and is unjustifiably connoting that counsel would be using standards other than those of 35 U.S.C. §116 and case law based on same without any proof. This is totally improper.

For example, the Advisory Action appears to be basing its opinion that Fostiropoulos is an inventor from its interpretation of the following passage on Page 150 of Baggott:

Very late one night in early May, Fostiropoulos placed a little of the soot and a thin quartz substrate in a glass tube. He then filled the open tube with argon, which forced out the air above the soot. He heated the bottom of the tube with the naked flame of a Bunsen burner. At first, the substrate did not appear to have changed: he could see no sign of a coating. But as he looked more closely, he noticed that the reflected light from the surface of the substrate did appear different: something had been deposited.

He was extremely tired, but nothing was going to keep him from measuring the spectrum. He placed the substrate in the ultra-violet/visible spectrometer and set the machine to scan the wavelength. He watched the recording pen intently as it moved over the chart paper and, for the second time in his life he felt the electric thrill of scientific discovery. There they were, three of the strongest, most beautiful camel humps he could ever wish to see. Gone, or at least significantly reduced, was the background absorption due to ordinary carbon soot. The sublimation process had worked: it really was that easy. He was the first person in the world to see the ultra-violet spectrum of almost pure buckminsterfullerene.

Fostiropoulos left the spectrum on Kratschmer's desk and headed home. It was time for sleep.

However, that passage is not inconsistent with the statement that Fostiropoulos worked under the supervision and control of Dr. Kratschmer in paragraph 8 of the Declaration. Putting the facts in perspective and context of the Declaration, one would conclude that this sublimation experiment was conducted pursuant to the instructions of Dr. Kratschmer. Does the United States Patent and Trademark Office expect that the advisor for the Ph.D. student would necessarily be performing the Ph.D. students' laboratory work? Does the United States Patent and Trademark Office expect the advisor to be present when a Ph.D. student performs his experiment? This is not the norm. The advisor outlines the procedure for the

Ph.D. student to follow, making the student an extra pair of hands for the advisor. The Ph.D. student performs the experiment and after the experiment is concluded, especially if important, the results are discussed with the advisor. That quoted passage does not preclude that possibility. There is nothing in the passage that would necessarily lead to a conclusion that the procedure described in the above passage was Fostiropoulos idea. However, the United States Patent and Trademark Office is reading more into Baggott than is really there. The United States Patent and Trademark Office appears to be reading the passages in Baggott through rose colored glasses, purposely interpreting the facts so that they are inconsistent with the statements of Kratschmer but without any suggestion in the art for it to reach that conclusion. This is improper.

The same conclusion is reached with respect to the passage referred to on Pages 138-139. The Advisory Action is assuming facts; although Fostiropoulos may be the one physically building the apparatus, this again does not necessarily imply that the apparatus was not built under the direction and supervision of Dr. Kratschmer. The passage is completely silent as to this issue and there is no reason, based on the passage, to conclude otherwise.

Thus, the United States Patent and Trademark Office has not met its burden and found any evidence contradicting the statements in the Kratschmer Declaration. Thus, contrary to the allegations in the Advisory Action, Baggott does not present evidence that Fostiropoulos is more than a mere co-author. Thus, the argument in the Advisory Action distinguishing In re Katz, is not correct. Just as in In re Katz, there is ambiguity created on the record. "The article does not tell us anything specific about inventorship". In re

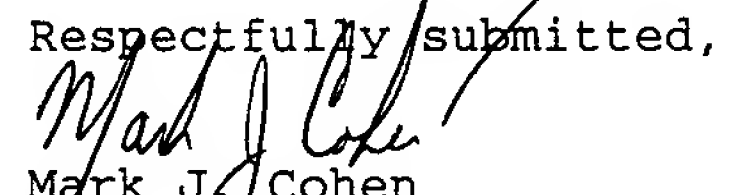
Katz, 687 F.2d at 455, 215 USPQ at 18. Neither does Baggott. Fostiropoulos cannot be presumed to be a co-inventor merely from the statements of Baggott; just because Fostiropoulos performed certain experiments, does not necessarily mean he is an inventor. Thus, the only facts on this issue comes from the Kratschmer declaration. The Advisory Action thus has not made out a prima facie case of co-inventorship of Fostiropoulos. Therefore, contrary to the allegation in the Advisory Action, the holding of In re Katz is applicable.

Thus, the record is consistent with the authors of the article being Kratschmer and Huffman. Therefore, the article is not an invention of another. Pursuant to the holding in In re Katz, it cannot be used as a reference against the present application. Thus, inasmuch as this is an improper reference to be cited against the present invention the rejection under 35 U.S.C. §103 is overcome; withdrawal thereof is respectfully requested.

With respect to the other issues raised in the Advisory Action and the Final Action, applicants incorporate by reference the arguments in the Response under 37 C.F.R. §1.116, especially on Page 3, Line 1 to Page 12, Line 10 thereof.

Therefore, in view of the Amendments to the claims and the Remarks herein and in the Response after Final Rejection, dated September 22, 1997, it is respectfully submitted that the present case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,


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RESPONSE UNDER 37 C.F.R.
1.116 EXPEDITED PROCEDURE
EXAMINING GROUP 1103



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Donald R. Huffman, et al. Examiner: P. DiMauro

Serial No.: 08/236,933

Art Unit: 1103

Filed: May 2, 1994

Docket: 7913ZAZY

For: NEW FORM OF CARBON

Dated: September 22, 1997

Assistant Commissioner for Patents
Washington, DC 20231

RESPONSE UNDER 37 C.F.R. §1.116

Sir:

In response to the Office Action dated April 22, 1997, and in accordance with the provisions of 37 C.F.R. 1.116, applicants submit the following Amendment for entry in the above-identified case.

IN THE CLAIMS:

Please amend Claims 45, 50, 67, 83, 84, 181, 204, 213, 222 and 230 as follows:

Claim 45, Line 2, delete "a" before "elemental carbon";

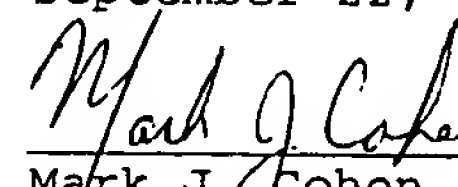
Claim 50, Line 2, delete "a" before "elemental carbon";

Claim 67, Lines 1-2, delete "the carbon source" and insert therefor --elemental carbon--;

CERTIFICATE OF MAILING UNDER 37 C.F.R. §1.8(a)

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, DC 20231 on September 22, 1997.

Dated: September 22, 1997


Mark J. Cohen

Claim 83, Line 2, delete "a" before "elemental carbon";

Claim 84, Line 2, delete "a" before "elemental carbon";

Claim 181, Line 2, delete "a" before "elemental carbon";

Claim 204, Line 2, delete "a carbon source" and insert therefor --elemental carbon--;

Claim 213, Line 2, before "elemental carbon", delete "a";

Claim 222, Line 2, before "elemental carbon", delete "a";

Claim 230, Line 2, before "elemental carbon", delete "a".

REMARKS

The Office Action has rejected Claims 45-84, 96, 181 and 203-231 under 35 U.S.C. §112, second paragraph, for allegedly failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. In addition, Claims 45-82 and 96 are rejected under 35 U.S.C. §112, first paragraph, as allegedly containing subject matter which is not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventor had possession of the claimed subject matter at the time that the application was filed. Further Claims 45-82 are rejected under 35 U.S.C. §112, first paragraph, as allegedly being non-enabling. Claims 45-84, 90, 181 and 203-331 are rejected under 37 C.F.R. §1.78(b) for allegedly conflicting with Claims 57-63, and 68-87 of USSN 08/486,669. Furthermore, Claims 45-84, 96, 181 and 203-231 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as allegedly being

unpatentable over Claims 57-63 and 68-87 of copending Application USSN 08/486,669. Finally, Claims 45-54, 96, 181 and 203-231 are rejected under 35 U.S.C. §103(a) as defining subject matter which is allegedly rendered obvious by the teachings in an article by Kratschmer, et al. in Chemical Physics Letters, 1990, 170, 167-170 ("Kratschmer, et al.") in view of U.S. Patent No. 3,094,428 to Hamilton, et al. and ("Hamilton, et al.") in view of an article by Kargin, et al. in Colloid Journal of the USSR, 1967, 29, 256-259 ("Kargin, et al.").

In response thereto, applicants have amended the claims, and are submitting herewith a Declaration by Dr. Kratschmer, which, when considered with the comments hereinbelow, are deemed to place the present case in condition for allowance. Favorable consideration is respectfully requested.

Applicants have amended each of the main independent claims to delete the word "a" prior to the term "elemental carbon" so that the claims recite that elemental carbon is being vaporized. Thus, any ambiguity that may have been present in the claims heretofore has now been eliminated. In addition, applicants have also clarified the amendments to Claim 67 and Claim 204 that were made in the previous Amendment. As Claim 67 and 204 now read, elemental carbon, not a carbon source, is being vaporized in the first step of the process.

The Office Action has rejected Claims 45-84, 96, 181 and 203-231 under 35 U.S.C. §112, second paragraph, for three reasons. The amendment described hereinabove overcomes the first reason for this rejection.

With respect to the second reason proffered by the United States Patent and Trademark Office, the Office Action

alleges that it is not clear in Claim 181 how much constitutes "amounts...capable of extracting and recovering therefrom said allotrope in solid form".

Applicants request clarification of the rejection since the language recited on Page 2 of the Office Action is not found in Claim 181. More specifically, the term "allotrope" is not recited anywhere in Claim 181. The claim is directed to a process for making C_{60} , and the claim recites that the C_{60} is present in the soot in amounts capable of extracting and recovering predominantly therefrom said C_{60} in solid form. Moreover, applicants submit that the language recited in the Office Action is not found in the other claims pending in this application. Therefore, clarification is requested as to which claim reference is being made.

If reference is being made to Claim 181, and if the issue is to the "amount" recited therein, applicants submit that the language used is non-ambiguous and clearly defines the metes and bounds of the invention.

Claim 181 recites that C_{60} is present in both the soot and the extract from the soot in such amounts that it can be recovered therefrom in amounts that could be seen with the human eye. The claims connote this amount in functional language by reciting that the C_{60} is present in amounts capable of extracting C_{60} from the soot in solid form and that it is recovered as a solid. Applicants submit that the presence or absence of sufficient material to be visible as a solid is a characteristic that is easily determinable.

However, the Office Action alleges that such a limitation is indefinite, and specifically asks "... if ... a microgram of C_{60} was an amount needed to qualify as solid C_{60} , would a process which produced a kilogram of soot which in toto contained microgram of C_{60} , ... be within the claims...?" In

addition, the Office Action raises the question, "what is the lower limit?" First, case law has held that lower limits need not be recited to comply with 35 U.S.C. §112, second paragraph. See, In re Kirsch, 498 F.2d 1389, 1393-1394, 182 U.S.P.Q. 286, 290 (CCPA 1974). But, more importantly, how can anything be more definite than visible versus not visible? From the beginning of time, man has relied upon his senses to determine if something is present, hence the adage "seeing is believing". The amount of C₆₀ and/or C₇₀ produced by the process of the present invention is in macroscopic amounts, amounts which are definitely discernible by the human eye. Thus, there is no indefiniteness in the amount produced. The objective test is whether visible amounts, that is, amounts sufficient to see, touch, and feel of C₆₀ and/or C₇₀ are recovered. What can be more clear than that?

With respect to the rejection of Claims 83, 84, and 222, the Office Action alleges that the language, "amount (or quantities) (of C₆₀) sufficient to be capable of producing a colored solution when extracted with sufficient (or effective) amounts to benzene" is unclear. Applicants disagree for the same reasons as hereinabove. This language connotes that sufficient (C₆₀ or C₇₀) is present so that when dissolved in a non-polar organic solvent, such as benzene, the benzene will become colored. Again, this is an objective test of whether appreciable amounts of C₆₀ and/or C₇₀ are formed. If the benzene solution remains uncolored when the soot comprising C₆₀ and C₇₀ is placed into sufficient benzene to dissolve the C₆₀ and/or C₇₀, then insufficient amounts of product are generated; on the other hand, if the benzene solution becomes colored, then sufficient amount of C₆₀ or C₇₀ is generated. The U.S.P.T.O. raises the issue that this is indefinite, alleging that visual acuity varies from person to person; however, the

test is color versus no color, i.e., something which is easily determinable and discernible, and which is an objective rather than subjective standard.

In both situations, the U.S.P.T.O. has failed to consider the history regarding fullerenes. Heretofore, no one had generated enough fullerenes, such as C_{60} , to be seen with the naked eye, or as indicated in Curl, et al., in Scientific American, 1991, Page 55, when dissolved in benzene produced a colored solution. Others heretofore could not generate sufficient amounts of C_{60} to obtain a colored solution. For example, when Smalley, et al. placed the soot they produced in benzene, the solution remained clear and the black soot sat on the bottom of the liquid. Id. However, the methodology of the present process produces such appreciable amounts of C_{60} and/or C_{70} that they can be visibly seen and they produce a colored solution when the entire product of C_{60} and/or C_{70} extracted from the soot is placed into benzene. Not only does this distinguish over the prior art, but as indicated hereinabove, these are simple tests to easily ascertain whether the requisite amount of product is produced.

The Office Action appears to have misinterpreted the claims; it utilizes as the standard the amount of sooty carbon product produced which when placed into benzene forms a colored solution. The claims do not use this as the criteria, since the soot goes to the bottom of the liquid. The color is formed when sufficient amounts of C_{60} and/or C_{70} are present in the soot sample. Thus, if a colored solution is produced under these circumstances then it meets the test recited in Claims 83, 84 and 222.

Applicants submit that this language in the claims clearly delineates the metes and bounds of the claims.

Thus, for the reasons provided, the rejection of the claimed subject matter under 35 U.S.C. §112, second paragraph, is obviated. Withdrawal thereof is respectfully requested.

Pursuant to the rejection of Claims 45-82 and 96 under 35 U.S.C. §112, first paragraph, the Office Action alleges that the specification does not have descriptive support for this term "macroscopic".

Applicants strongly disagree.

With respect to the description requirement, there is adequate support in the application for the term "macroscopic". Literal support is not necessary for compliance with the description requirement as long as the application conveys the concept to the skilled artisan. This the application adequately does. More specifically, support for this term and concept permeates the specification. For example, attention is directed to Page 7, Lines 10-25, and to Example 1 of the instant specification wherein it is specified that the C₆₀ product is obtained as a powder and wherein the color of the product produced therefrom is indicated. Moreover, attention is directed to Page 7, Lines 10-25 in addition, wherein the specification describes that when the sooty product is placed into a non-polar solvent, e.g., benzene, the benzene became colored and the product produced after extraction with the non-polar solvent is colored. Obviously, one cannot determine these characteristics unless it is present in amounts that can be seen with the naked eye, i.e., macroscopic amounts. If less than macroscopic amounts were produced, no color would be seen. See, Curl, et al, Scientific American 1991, 54-55.

Furthermore, attention is directed to Figure 2, of the instant specification wherein a X-ray diffraction pattern is provided of a product produced in accordance with the present invention. As the skilled artisan is well aware, macroscopic quantities

had to be available to generate a X-ray diffraction of the product. In addition, attention is directed to Page 11, Line 30 of the instant specification wherein it is indicated that the IR is taken of an approximately two micrometer thick C_{60} coating on a silicon substrate. Especially since C_{60} is colored, it is obvious that this coating had to be seen with the naked eye. Furthermore, the application makes additional references to characteristics of the product that can only be discernible if the material is present in macroscopic amounts. For example, the application describes that the product produced by sublimation of the carbon soot can range from a uniform film to a coating, and the color is brown to gray depending on the thickness of the coat formed, while the product obtained from extraction is a dark brown to black crystalline material. Obviously, these characteristics can be differentiated if the product was produced in amounts that can be seen with the human eye. In addition, on Page 2, Line 13, the application states that before the prior invention, no one had made C_{60} or C_{70} in appreciable amounts. The implication is that the present inventors were successful in achieving this goal, consistent with the teachings in the application. Appreciable by definition means "enough to be perceived", See Webster Unbridged Dictionary 2nd Ed. p. 91 (1983). Thus, appreciable is synonymous with "macroscopic".

It is important to keep in mind that which was not stated; if the products produced can only be detected through instrumentation, such representation would have been made in the application and evidence supporting same such as electron micrographs would have been provided. In fact, the application acknowledges that C_{240} was observed from a scanning tunneling microscopic image. The fact that such statements were not made and such evidence was not provided with respect to C_{60} and C_{70} ,

for example, is further evidence that these products were formed in macroscopic amounts.

Case law has held that the description requirement is met if the application conveys to the skilled artisan that the applicants has possession of the invention at the time of the filing of the application. Vas Cath Inc. v. Mahurkar, 935 F.2d 1535, 19 USPQ2d 1111 (Fed. Cir. 1995).. In other words, the applicant must convey with reasonable clarity to the skilled artisan that as of the filing date he or she was in possession of the invention. Vas Cath Inc., 935 F.2d at 1563-64, 19 USPQ 2d at 1117. Attention is directed to the Kroto Declaration previously submitted, Paragraphs 14 and 15, in which he attests that the application adequately describes the method for making macroscopic amounts of fullerenes, such as C₆₀ and C₇₀ and that based upon the teachings in the application, it is his opinion that the inventors had in their possession at the time of the filing of the application macroscopic amounts of same.

(Emphasis added). Kroto, who is a skilled artisan in the field, understood from reading the application that the applicants had made macroscopic amounts of fullerenes and had it in their possession at the time of the filing of the application, providing further evidence that there is adequate support in the specification for the term "macroscopic". Since a skilled artisan testified that the application describes the production of fullerenes, such as C₆₀, in macroscopic amounts, how can the United States Patent and Trademark Office ignore a statement from the skilled artisan that he understood from reading the application that applicants had made macroscopic amounts of fullerenes, e.g. C₆₀ or C₇₀? Case law had held that if a person of ordinary skill in the art would have understood from reading the specification that the inventor had possession of the claimed invention at the time of filing the application,

then the written description required by 35 U.S.C. §112, first paragraph, is met. In re Alton, 76 F.3d 1168, 37 USPQ2d 1578 (Fed. Cir. 1996). Since Dr. Kroto so testified, then the written description requirement is met. Id.

Thus, the application fully complies with the description requirement of 35 U.S.C. §112, first paragraph.

In addition, the specification fully complies with the enablement requirement of 35 U.S.C. §112, first paragraph, and adequately teaches one skilled in the art how to make the claimed invention without an undue amount of experimentation. The specification provides the general teaching to the skilled artisan of how to prepare C₆₀ and C₇₀ in macroscopic amounts. If the skilled artisan follows the procedure described in the specification, macroscopic amounts of material would be produced. Attention is again directed to the Declaration of Kroto, paragraphs 3, 8 and 15, wherein he attests that the application adequately describes how to make fullerenes, including C₆₀ and C₇₀, in macroscopic amounts. Contrary to the allegations in the Office Action, case law does not require the applicant to describe in their specification every conceivable embodiment of the invention. US v. Teleelectronics, 857 F.2d 778, 786, 8 USPQ 2d 1217, 1222 (Fed. Cir. 1988) (citing SRI Int'l v. Matsushita Elec. Corp. of America, 775 F.2d 1107, 1121, 227 USPQ 577, 586 (Fed. Cir. 1985)). It is not therefore necessary to specifically exemplify that tonnage quantities can be made in accordance with the present process. The specific teachings and exemplification in the specification provide an adequate teaching to accomplish this objective without an undue amount of experimentation. Again, it is improper for the United States Patent and Trademark Office to ignore the testimony of Dr. Kroto, a skilled artisan, who testified that

the application adequately describes to the skilled artisan how to make macroscopic amount of C₆₀.

In the rejection, the Official Action states that the original language of the specification only supports the production of C₆₀/C₇₀ in quantities sufficient to produce coatings that are 2 microns thick. This amount produced is described in Ex. 1, and is only exemplary of the amount of product that could be produced by the present process. However, the United States Patent and Trademark Office is utilizing an engineering issue involving "scaling up" to support its allegation of lack of enablement. This is contrary to case law. There is nothing in the law which requires the applicants to scale up in the application the "amount" of products prepared by their process. This is an inappropriate basis for supporting an allegation of non-enablement. Even if some experimentation is required, case law had held that if the amount of experimentation is not duly extensive, the specification is still enabling. U.S. v. Telectronics, Inc., 857 F.2d 778, 8 USPQ2d 1217 (Fed. Cir. 1988), cert denied, 490 US 1046 (1989). Applicants submit that based upon the teachings in the specification, an undue amount of experimentation is not required to produce larger amounts of C₆₀. For example, based upon the teachings, the skilled artisan can scale up the amount of product produced without an undue amount of experimentation. For example, if a greater amount of elemental carbon were used, additional material would be collected. Moreover, if the exact methodology in Ex. 1 were repeated an infinite amount of times, there can be no question that an infinite amount of material would be collected. Dr. Kroto understood that undue amount of experimentation was not required to prepare macroscopic amounts of C₆₀ and C₇₀, based upon his reading of the specification, why can't the United

States Patent and Trademark Office? Thus, it is absurd for the United States Patent and Trademark Office to state that the application is not enabling for the larger quantities of product to be produced.

Thus, the application is enabling for the subject matter claimed. Therefore, the rejection of the claims under 35 U.S.C. §112, first paragraph, is obviated, and withdrawal thereof is respectfully requested.

Thus, the specification complies with the requirements of 35 U.S.C. §112, first and second paragraphs.

Withdrawal of these rejections is respectfully requested.

With respect to another rejection of Claims 45-84, 96, 181, 203-231, the Office Action cites 37 C.F.R. §1.78(b) in support of its rejection that these claims conflict with Claims 57-63 and 68-87 of the '669 application. The Office Action requests Applicants to either cancel the conflicting claims or to maintain a clear line of demarcation between the applications. This is an improper rejection since there is no statutory basis for the rejection. Nevertheless, there is a line of demarcation between the claimed subject matter in the present application and the claims in copending application USSN 08/486,669. The present case is directed to a process of preparing C₆₀ and or C₇₀ or products containing same, while the copending application is directed to processes for preparing fullerenes and/or products containing same. Thus, there is a clear line of demarcation between the applications.

The Office Action maintains that to constitute a clear line of demarcation, it is necessary that the claims in the application be patentably distinct. This of course, is contrary to practice and case law. Although applicants believe that the applications are directed to patentably distinct

inventions, this is not the standard. For example, attention is directed to MPEP §806.04 (i), which permits an application directed to a genus to issue even after the application to a species issues. Thus, it is permissive to have one application directed to a species and another application directed to a genus, as in the present circumstances. Thus, the rejection of the claims under 37 C.F.R. §1.78(b) is improper, and withdrawal thereof is respectfully requested.

Pursuant to the provisional rejection of Claims 45-84, 96 and 160-231 under the judicially created doctrine of obviousness-type double patenting, the Office Action cites Claims 45-68 of copending application USSN 08/486,669.

Since the claims in neither application has been patented, it is premature to reject the claims on this ground at this time, especially since these may not be the final version of the claims. When one of the applications matures into a patent, then it would be the appropriate time to raise this issue.

In addition, applicants further submit that the provisional double patenting rejection is not applicable in the present circumstances.

In considering the question of obviousness-type double patenting, only the claims of the two applications are compared. Quad Environmental Technologies, Corp. v. Union Sanitary District, 946 F.2d 870, 873, 20 U.S.P.Q. 2d 1392, 1394. The question to consider is whether any claims in the two applications define merely an obvious variation of an invention disclosed and claimed. In re Vogel, 442 F.2d 438, 441, 164 U.S.P.Q. 619, 622 (CCPA 1970).

The Office Action alleges that the claims are not patentably distinct from each other because the respective claims only differ in the functional recitation of how much C₆₀

fullerene is made in the carbon vaporization process. It further alleges that the subject matter in both applications is directed to the production and recovery of C₆₀ fullerenes. However, applicants respectfully submit that the claims in the two applications do not differ in the manner alleged in the Office Action. The present application is directed to a process of making C₆₀ and/or C₇₀ in macroscopic amounts, while the '669 application is directed to the process of making fullerenes in macroscopic amounts. The subject matter of the present application is thus not directed to the same patentable invention as that claimed in the copending '669 application. Consequently, the rejection of the claimed subject matter on these grounds is obviated, and withdrawal thereof is respectfully requested.

Pursuant to the rejection of Claims 45-54, 58, 62-63, 65-78, 83-84, 96, 160-163, 167-169, 171-183, 187-188, and 192-202, the Office Action cites Kratschmer, et al. in view of Hamilton et al. and Kargin, et al.

Kratschmer, et al. describe a process of preparing carbon smoke particles by evaporating graphite rods by resistive heating in a conventional glass bell evaporator filled with an inert quenching gas such as helium at pressures greater than, for example, 100 Torr. It also discloses collecting the smoke. The article postulates that C₆₀ may be present in the smoke. But, in contrast with the present invention, the reference does not teach, disclose or suggest how to extract the C₆₀ from the soot. Thus, the reference never separated the C₆₀ from the soot.

The Office Action agrees, and it cites Hamilton, et al. and Kargin, et al. to allegedly overcome this deficiency.

According to the Office Action, Kargin, et al. disclose that carbon particles made from the condensation of

carbon vapor in an argon atmosphere can be deemed to be carbon black. The Examiner further alleges that the carbon particles were prepared from a graphite anode and cathode opposed to one another, wherein a plasma is formed therebetween by passing current to the electrodes. The Office Action then cites Hamilton, et al., alleging that it discloses that carbon black is dispersed in benzene to form ink compositions. The Office Action concludes that it would have been obvious to have dispersed the carbon smoke particles of Kratschmer, et al. in benzene because Hamilton, et al. "teach that it is known to disperse carbon black in benzene in order to form ink compositions or rubber compositions and because Kargin, et al. would teach...to recognize Kratschmer's particle as being carbon black."

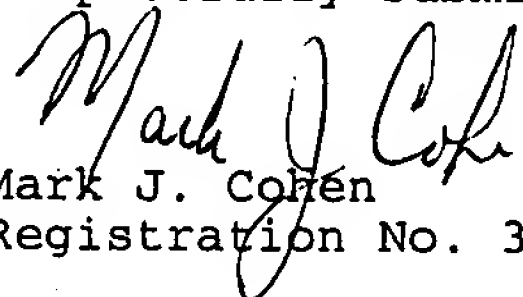
Kratschmer, et al. is not a proper reference. The article list three authors, Kratschmer, Huffman and K. Fostiropoulous. Case law had held that authorship of an article by itself does not raise a presumption of inventorship with respect to the subject matter disclosed in that article. In re Katz, 687 F.2d 450, 455 215 USPQ 14, 18 (CCPA 1982). It raises just a issue of ambiguity regarding inventorship. Id. However, to clarify that ambiguity, submitted herewith is a Declaration by one of the inventors, Dr. Kratschmer. Dr. Kratschmer testifies that K. Fostiropoulous was working directly under Dr. Kratschmer in his laboratory. (See Paragraph 7 of Declaration) Furthermore, as testified by Dr. Kratschmer, the experiments described in the article which were performed by K. Fostiropoulous were conducted under the direction and supervision of Dr. Kratschmer (See Paragraph 8 of Declaration). Thus, based upon the explanation of Dr. Kratschmer in his Declaration, K. Fostiropoulous is not an inventor of the subject matter in the publication. Therefore,

the inventive entity of the article by Kratschmer, et al. is Kratschmer and Huffman, i.e., the inventive entity of the present application. Under these circumstances, the inventive entity of the article is the same as the inventive entity of the application. Thus, the article is not the work of another and thus does not qualify as prior art under 35 U.S.C. §102(a). Id. at 455-456, 215 USPQ at 18. Therefore, it is improper to cite Kratschmer, et al. as a reference.

Inasmuch as Kratschmer, et al. cannot be used as a reference, the '103 rejection cannot be based using the Kratschmer, reference; therefore, it is improper to use the combination of Kratschmer, et al. Hamilton, et al. and Kargin, et al. to reject the claimed subject matter. Therefore, the '103 rejection is overcome, and withdrawal thereof is respectfully requested.

Thus, in view of the amendment to the claims and the remarks hereinabove, and the Declaration of Dr. Kratschmer, it is respectfully submitted that the present case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,


Mark J. Cohen
Registration No. 32,211

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MJC/bb



PATENTS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Donald R. Huffman, et al. Examiner: P. DiMauro
Serial No.: 08/236,933 Art Unit: 1103
Filed: May 2, 1994 Docket: 7913zazy
For: NEW FORM OF CARBON

Assistant Commissioner for Patents
Washington, DC 20231

DECLARATION

Sir:

I, WOLFGANG KRATSCHMER, declare and say as follows:

1. I am one of the co-inventors of the subject matter described and claimed in the above-identified application.

2. The other co-inventor of the subject matter described and claimed in the above-identified application is Donald R. Huffman.

3. It should be noted that Donald R. Huffman and I are professors at different institutions. Donald R. Huffman is a professor in the Department of Physics at the University of Arizona in Tucson, AZ while I am a professor at the Max Planck Institute for Kernphysik in Heidelberg, Germany.

4. Moreover, both of us are among the co-authors of an article entitled: "The infrared and ultraviolet absorption spectra of laboratory produced carbon dust: evidence for the present of the C_{60} molecule" in Chemical Physics Letters, 1990, 167-170 (hereinafter referred to as the article).

5. In addition to myself and Donald R. Huffman, there is an additional co-author of the article described in the previous paragraph: K. Fostiropoulos.

6. While K. Fostiropoulos is a co-author of the publication, it is my opinion that and I have been advised by

counsel that he is not a co-inventor of the subject matter described and claimed herein.

7. At the relevant time, K. Fostiropoulous was a doctoral student conducting experiments in my research group in the laboratories at the Max-Planck Institute in Heidelberg, Germany towards completion of his doctorate from the University of Heidelberg in Germany.

8. Although K. Fostiropoulous performed experiments described in the article, those experiments described therein which he performed were conducted under my direction and supervision.

9. It is my opinion that and I have been advised by counsel that K. Fostiropoulous is not an inventor of the subject matter described in the publication.

10. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above-referenced application or any patent issuing thereon.

Dated:

Sept. 10, 1992

W. Kratschmer
WOLFGANG KRATSCHMER

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appraise

ap-praise, *v.t.* [appraised, *pt.*; appraising, *pp.*] (M.E. *apreien*; O.Fr. *apreier*; *apreier*, *apreier*, *apreier*; L.L. *apreiare*, to value, esteem.)
 1. to set a value on; to estimate the worth of; to value officially.
 2. to estimate the quantity of.
 3. to judge the quality or worth of.
 4. to praise; to speak well of. [Rare.]
ap-praise-ment, *n.* 1. the act of setting the value; the business of an appraiser.
 2. an appraised value.
ap-praiser, *n.* one who appraises; specifically, a person given authority to make a thorough and correct valuation on property of any kind.
ap-praise-er, *n.* [L. *apreier*, to worship; *apreier*, to go to and pray to; *apreier*, to pray.]
ap-praise-ful, *adj.* 1. enough to be appraised or estimated; perceptible; as, an appreciable amount.
 2. that can be appreciated.
ap-praise-ment, *n.* 1. an appreciable manner; an appreciable extent.
ap-praise-ment, *adj.* 1. appreciative. [Rare.]
ap-praise-ment, *adj.* 2. appreciated. [Rare.]
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ap-praise-ment, *adj.* 100. appreciated. [Rare.]

appropriation

5. in golf, a stroke after the tee shot, meant to knock the ball onto the putting green.
 6. an approaching (which see).
 7. [pl.] in fortification, the works thrown up by besiegers to protect them in their advances toward a fortress or fortified town.
ap-proach-a-ble-ty, *n.* approachableness.
ap-proach-a-ble, *adj.* 1. able to be approached; specifically, (a) easy of access; (b) friendly; informal.
ap-proach-a-ble-ness, *n.* the state of being approachable.
ap-proach-er, *n.* one who approaches.
ap-proach-ing, *n.* in horticulture, the act of ingrafting a sprig or shoot of one tree into another, without cutting it from the parent stock; called also *inarching*, or *grafting by approach*.
ap-proach-less, *adj.* unapproachable; without an approach.
ap-proach-ment, *n.* approach. [Obs.]
ap-pro-bate, *adj.* approved. [Obs.]
ap-pro-bate, *v.t.* 1. to express approbation of; to manifest a liking for or degree of satisfaction with; to approve.
 2. to sanction.
 3. in Scots law, to approve as valid.
 4. to *approve* and *reprove*; in Scots law, to accept and reject, as when one tries to profit by part of a deed while rejecting the rest.
ap-pro-ba-tion, *n.* [L. *approbatio*, an approving, assenting to, from *approbare*, to approve.]
 1. the act of approving; approval; commendation.
 2. sanction.
 3. a novitiate or probation. [Obs.]
 4. attestation; proof. [Obs.]
 Syn.—approval, assent, concurrence, commendation, praise, permission, liking, consent.
ap-pro-ba-tive, *adj.* approving; implying approbation.
ap-pro-ba-tive-ness, *n.* 1. in phrenology, love of approbation.
 2. the quality of being approbative.
ap-pro-ba-tor, *n.* one who approves. [Rare.]
ap-pro-ba-tory, *adj.* containing approbation, expressing approval or sanction.
ap-prompt, *v.t.* to prompt; to stimulate. [Obs.]
ap-proof, *n.* 1. approval. [Archaic.]
 2. proof; the act of testing. [Archaic.]
ap-pro-pin-quate, *v.t.* [L. *appropinquare*, to approach, draw near.] to draw near. [Archaic.]
ap-pro-pin-quation, *n.* a drawing nigh. [Archaic.]
ap-pro-pin-quity, *n.* propinquity; nearness. [Rare.]
ap-pro-pre (-për), *v.t.* to appropriate. [Obs.]
ap-pro-pri-a-ble, *adj.* capable of being appropriated, set apart, sequestered, or assigned exclusively to a particular use.
ap-pro-pri-a-ment, *n.* a characteristic peculiar to oneself. [Obs.]
ap-pro-pri-ate, *v.t.* appropriated, *pt.* *pp.*; appropriating, *ppr.* [M.E. *apropren*; O.Fr. *aproprier*; Fr. *appropriier*; L.L. *appropriare*, to appropriate; L. *ad*, to, and *proprius*, one's own.]
 1. to set apart for, or assign to, a particular use, in exclusion of all other uses; as, a spot of ground is *appropriated* for a garden; money is *appropriated* by Congress for public buildings.
 2. to take to oneself in exclusion of others; to claim or use as by an exclusive right.
 3. to make suitable. [Rare.]
 4. in ecclesiastical law, to sever (an ecclesiastical benefice) and annex it to a spiritual corporation, for its perpetual use.
 Syn.—arrogate, assume, seize, usurp.
ap-pro-pri-ate, *adj.* 1. belonging peculiarly; special.
 2. set apart for a particular use or person. [Obs.]
 3. fit or proper; suitable; as, *appropriate* manners.
 Syn.—particular, becoming, congruous, suitable, adapted, peculiar, proper, meet, fit, apt.
ap-pro-pri-ate, *n.* a peculiar characteristic; attribute; property. [Obs.]
ap-pro-pri-ate-ly, *adv.* in an appropriate or proper manner; suitably; fitly.
ap-pro-pri-ate-ness, *n.* the quality of being appropriate, or especially suitable.
ap-pro-pri-a-tion, *n.* [L.L. *appropriatio*, from L. *ad*, to, and *proprius*, one's own.]
 1. an appropriating or being appropriated.
 2. a sum of money, or any other thing, set apart for a given purpose; as, an *appropria-*

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